SMALL WIND

FACTSHEETS

The Economics of Small Wind

Although small wind systems involve a significant initial investment, they can be competitive with conventional energy sources when you account for a lifetime of reduced or altogether avoided utility costs, especially considering escalating fuel costs.

The cost of buying and installing a small wind energy system typically ranges from about $3,000-5,000 per kilowatt for a grid-connected installation, less than half the cost of a similar solar electric system. The length of the payback period (or, the time it takes to "break even") depends on the system you choose, the wind resource at your site, your power provider's electricity rates, and financing and incentives available. Small wind owners with strong average wind speeds who can take advantage of rebate programs can usually recoup their investments within fifteen years.

Many states have rebate or tax credit programs in place to encourage small wind and other renewable energy applications. AWEA's state-by-state[1] pages provide information specific to buying and installing a small wind turbine in each of several U.S. states, including the availability of net metering[2], local or state incentive programs, and utility incentives.

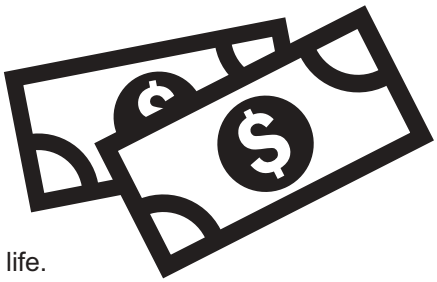
The cost of a wind system has two components: initial installation costs and operating expenses. Installation costs include the purchase price of the complete system (including tower, wiring, utility interconnection or battery storage equipment, power conditioning unit, etc.) plus delivery and permitting costs, installation charges, professional fees and taxes.

A Good Investment for Windy Landowners with High Bills

A 10-kW grid-connected residential-scale system generally costs $35-40,000 to install. The best candidates for these systems are rural homes and businesses with at least an acre of property, a Class 2 or better wind resource[3], and utility bills averaging $150 per month or more.

If a net metering arrangement[4] is available from the utility, most of the power generated by a grid-connected system can be valued at the retail rate of electricity, reducing the amount of time it takes for a system to pay for itself.

In California, where net metering and the nation's highest electric rates are combined with a substantial rebate program and a state tax credit, small wind system owners with strong wind resources can recoup their initial investment in under 10 years, and enjoy essentially free electricity for the remainder of the system's 30-year useful life.



Such a wind energy system can be an excellent, low-risk investment. It can provide a return of up to 15-20%, depending on electric usage and the wind resource.

Smaller Systems Can Offset Electricity Costs, Provide Independence

Smaller wind energy systems also can be used to

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offset electricity costs, or to independently power specific applications such as water pumps or recreational vehicle lights and appliances.

A 3 kW turbine, including 60-80 foot tower, utility-tie inverter, batteries for back-up system, utility switch box, battery system box, hardware and installation components, costs about $15,000. A homeowner using $60-100 per month of electricity can save 10-20% off the electric bill with a 1 kW turbine, given strong wind resources. The same homeowner could expect to save 30-60% off that electric bill using a 3 kW turbine. (Savings depend on average annual wind speed, tower height, electrical cost and average electric bill.)

Systems smaller than 1 kW are more typically used in stand-alone applications, or as part of a hybrid system with solar PV cells. A 400-watt system can be installed for $1,500.

Remote systems may require operating battery storage. Individual batteries cost from $150 to $300 for a heavy-duty, 12 volt, 220 amp-hour, deep-cycle type. Larger capacity batteries, those with higher amp-hour ratings, cost more. A 110-volt, 220 amp-hour battery storage system, which includes a charge controller, costs at least $2,000.

Off-Grid Systems Can Be the Least-Cost Option for Electricity

The cost of extending the utility grid to a new home location can be significant, sometimes as high as $20,000-$30,000 for a distance of only one-quarter of a mile. For the same initial investment, a utility-independent renewable energy system can be installed that will meet the electricity needs of an energy-efficient home. Such a system will typically include a combination of a wind turbine, photovoltaics, batteries, an inverter, and a back-up generator. These systems can be cost-effective on a first-cost basis alone, not to mention the avoidance of monthly utility bills for years to come.

The Electric Power Research Institute has gone so far as to suggest that in some cases it may make more economic sense to remove under-used transmission lines in the United States and serve the loads with hybrid stand-alone power systems rather than continuing line maintenance.

More information on the economics of small wind systems can be found in the U.S. Department of Energy's Consumer Guide to Renewable Energy for Your Home or Energy[5] and the Iowa Energy Center's Wind Energy Manual.[6]

See AWEA's online Small Wind Toolbox[7] for descriptions and links to numerous financial incentives including:

- Investment Tax Credits
- Investment Incentives (grants/rebates)
- Revolving Loan Funds
- Sales Tax Reductions
- Property Tax Reductions

References:

[1] www.awea.org/smallwind/

[2] www.eere.energy.gov/greenpower/netmetering/nmtable.shtml

[3] See www.eere.energy.gov/windpoweringamerica/wind_resources.html

[4] www.awea.org/faq/netbdef.html

[5] www.eere.energy.gov/power/consumer/eval_wintrb_economics.html

[6] www.energy.iastate.edu/renewable/wind/wem/wem-13_econ.html

[7] www.awea.org/smallwind/toolbox/default.asp